MONITORING ABUNDANCE AND DISTRIBUTION OF ROOSEVELT ELK IN 1996 IN REDWOOD NATIONAL AND STATE PARKS

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INTRODUCTION

Many studies have been performed on the Roosevelt elk of Redwood National and State Parks (Stevens 1965, Franklin 1968, Harper et al 1967, Mandel and Kitchen 1979, Grenier 1992). However, none of these investigations have performed comprehensive calculations of the vital statistics necessary to make sound judgements of the welfare of local Roosevelt elk herds. Some classification counts have been recorded on local herd units by other researchers but long-term trends can not be drawn from these data because the counts have not been consistently performed in similar areas.

Population statistics important in judging the welfare of animal populations include age and sex ratios, natality and mortality rates, and probability of survival (Downing 1980).   Ratios between young and old animals are an important source of information to help determine natality and rearing success of the herd (Downing 1980, Bailey 1984).

Availability of habitat is probably the ultimate controlling parameter determining the size of wildlife populations. Many large clearcuts have occurred in the forests in and around the RNSP lands since the 1940's. These management actions have probably allowed elk to expand populations in some areas. However, since the establishment of the parks, the total quantity of elk habitat is probably reduced relative to the era of intensive logging.

The goal of this project is to develop a long-term data set to monitor the age and sex structure of elk herd units throughout RNSP. Preliminary classification counts were conducted in 1996 to establish locations that provided enough open terrain to survey for individual herds and to establish when the best (most time efficient) time of the year to classify animals would be.

METHODS

Classification counts were performed by driving or hiking throughout the parks and using binoculars and spotting scopes to determine the age and sex of elk observed. All animals born in 1995 were classified as calf until April of the year following birth. All bulls that did not have a brow tine were classified as spike, even if they had a fork in their antler.

Each observation record included an estimate on the quality of the data gathered. A scale of one to four was used to determine the uncertainty of the observation. A rating of one indicated a good visibility and the animals were close enough to observe with confidence. A rating of four indicated that the observation was unacceptable for determining herd composition parameters because of poor visibility due to darkness, fog or topography. In calculating the ratio of adult cows to calves, ratings of 3 and 4 were dismissed due to poor quality of observations.

RESULTS

During 1996, 89 groups of elk were classified. The ratio of calves per 100 cows ranged from 8 to 45 at different herd units throughout the park (Table 1). We have not tried to classify animals in the Lost Man Creek drainage or on the west side of Redwood Creek.

Table 1. Summary of herd unit classification counts for Roosevelt elk in RNSP

1996 Elk Classification Data						
Location	Bulls	Spikes	Cows	Calves	Total	calves per 100 cows
Stone Lagoon	1	3	67	18	87	23
Lower Redwood Creek	4	5	28	11		39
Elk Prairie	2	2	25	2	31	8
SOC	6	4	11	5	26	45
Davison Ranch	16	6	38	9	69	23
Bald Hills	1	16	78	20	115	25

DISCUSSION

Estimates of abundance have varied considerably over the years (Table 2). Large herds have been observed in the Boyes Prairie (Elk Prairie located within Prairie Creek State Park) and Gold Bluffs beach areas in the past (Franklin1968, Lieb 1973).   Both investigations concluded that no interchange of animals occurred between these two locations. This raises a question that can only be determined by recognition of individuals (either through characteristic morphological features or marked animals). Based on observations from the last two years, there appears to be some fluctuation in the number of individuals that are seen between observations. This indicates the herd units are somewhat dynamic and some individuals are likely to wander from the herd. The information gathered in 1996 indicates that the animals observed along the Highway 101 bypass are probably the same animals that utilize the Elk Prairie at times.

Currently, classification data is the only information we have to judge the reproductive success of Roosevelt elk in RNSP. There is no information available to estimate the death rate on elk in the parks. Bailey (1984) noted that a stable population might have up to 50% fluctuation in total numbers.

Table 2. Summary of abundance estimates from previous studies.

Roosevelt Abundance Estimated from Past Studies		
Year	**Estimate**	**Source of Information**
1963	1000	Park Files
1965	170 - Prairie Creek State Park 80 - Gold Bluffs Beach	Stevens 1965
1973	200-250 in Prairie Creek SP, Gold Bluffs Beach and ARCO cutover lands surrounding Prairie Creek SP	Lieb 1973
1979	580 (195 in the Prairie Creek and Gold Bluffs Beach areas combined)	Kitchen and Mandel 1980

Calf to cow ratios provide a relative index to reproductive success. Calf/cow ratios reported by Mandel and Kitchen (1979) were 17 and 31 calves per 100 cows for the two years they estimated this statistic. These authors combined all data gathered in and around RNSP. Stevens (1965) noted 30 calves/100 cows at Prairie Creek State Park (PCSP). Lemos (1971) reported 25 calves per 100 cows on the ARCO cutover lands just south of PCSP. Approximately 30 to 40 calves per 100 cows is the range observed for Rocky Mountain elk on the National Elk Refuge during mid winter after the herd unit has been through a hunting season (Bruce Smith pers. Comm.). It appears that in the absence of hunting pressure, there should be a higher calf to cow ratio observed in the elk herds of RNSP. Hypotheses to explain the low ratio would include either a high rate of neonatal mortality or a lower rate of conception by adult females.

Calf/cow ratios for 1996 are extremely low in the Elk Prairie herd unit (Table 1). More research in the files and additional years of classification may be necessary to determine just how much of a concern low calf production in this herd unit may be.

High calf/cow ratios at Davison Ranch in September (Table 1) could be a result of observability. Females with young may be more visible than females without young (Thomas and Toweill 1982). Grenier (1992) noted that in the Redwood Creek basin females without calves are more likely to stay in the forest. Thus, this may explain the high ratio observed in the Davison Ranch herd unit.

Group size at Gold Bluffs beach was very small in 1996 (mean =4.8 elk per observation). Observations indicate that the number of elk in this herd has declined considerably since 1978 when Mandel and Kitchen (1979) estimated the herd to have about 55 elk. I suspect that our methods failed to adequately sample the remaining elk at Gold Bluffs Beach. On one occasion a carcass of a female was observed with a bullet hole in the chest and one front quarter of meat missing. If poaching has been a persistent problem elk are likely to relocate to more secure habitat and consequently be less visible for herd unit classification.

At the South Operations Center 3 calves were born in 1995 and survived until calving season in 1996. Classification counts after July of 1996 noted three spikes in this group.

The total number of elk observed at Boyes Prairie was similar to the total numbers observed along the Bypass. I suspect that these elk roam between the two locations and the forest west of the prairie.

Observations in the Bald Hills indicate that throughout the summer period elk remain in small groups. Comparison of classifications in April and November present a question about the difficulty in classifying calves from the previous year just prior to parturition. The two late March counts on the Maneze Prairie also show inconsistent results. The ability to determine the quality of the observation will need to be refined in future years.

The herd using lower Redwood Creek presents a puzzle to solve in the coming years. The group appears to move around but is only observable when using the creek bottom. Classifications were successful only when performed early in the mornings. From 10 to 18 September the group did not use this area and could not be found. The number of animal in the observed groups varied more than in any other location where elk were classified.

Recommendations

1) Compile data through a search of the files to document fluctuation in abundance and classification count ratios over time at the Elk Prairie (Boyes Prairie).

2) Actively hunt for elk calves and try to quantify the number in each herd unit from Jun to September.

3) Perform a series of structured classification counts (same route 4 to 7 times) in the fall to develop an index t relative abundance and herd unit age structure.

4) Mark a representative number of animals in each herd unit to develop an index to abundance. A model named NOREMARK could be used to calculate herd unit abundance without having to continue capturing animals unless the known number of marked animals became too few.

5) Initiate research to determine conception rates of adult females and age at first breeding.

6) Capture a representative group of calves to follow and construct a life expectancy table for local populations.

7) Collect incisors from all known mortalities and determine age and cause of death.

8) Begin fitting animals with transmitters to determine the boundaries of different herd groups.

Management Questions

⇨ Where are the local elk herds on the population growth models? Increasing, declining or stable.
⇨ Where are population numbers relative to carrying capacity?
⇨ How do local population numbers correlate with habitat conditions? Is there a high incident rate of diseases? Is there a heavy parasite load?
⇨ Can juvenile mortality be determined by classification counts?
⇨ Can population trends be determined by classification counts?

These questions all need to be addressed to help develop a long term monitoring program. In the near future, management will need to make decisions regarding cooperative efforts with neighbors in areas where elk create depredation problems near park boundaries.

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PERSONAL COMMUNICATIONS

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